CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.08/NVR/CSR-03/292m/CEMENT/2016-17 Date: 11.03.2017

TEST REPORT ON CEMENT

* Customer	:	**Asst. Executive Engineer**, Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Cement
Sample Received on	:	10.03.2017
Period of Testing	:	10.03.2017 to 11.03.2017

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988 (RA-2014)	28.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988 (RA-2014)	160 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988 (RA-2014)	480 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988 (RA-2014)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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****

VIDYARANI P.K.
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Assistant Executive Engineer,
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Job No.: CTCE/BBMP/W.No.08/NVR/CSR-03/292m/SAND-Gradation/2016-17 11.03.2017

TEST REPORT ON SIEVE ANALYSIS OF FINE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Fine Aggregates
Technical Reference	:	IS : 2386 (Part 1) - 1963 (RA-2011)
Sample Received On	:	10.03.2017
Date of Testing	:	11.03.2017

Total Wt. of Aggregates in gms = **1000**

IS Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2011)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	96.10	90-100	90-100	90-100	95-100
2.36	76.30	60-95	75-100	85-100	95-100
1.18	55.30	30-70	55-90	75-100	90-100
600 Micron	27.30	15-34	35-59	60-79	80-100
300 Micron	16.40	5-20	8-30	12-40	15-50
150 Micron	4.40	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.08/NVR/CSR-03/292m/AGG/GR/2016-17 11.03.2017

TEST REPORT ON SIEVE ANALYSIS OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Coarse Aggregates (40mm)
Technical Reference	:	IS : 2386 (Part 1) -1963 (RA-2011)
Sample Received on	:	10.03.2017
Date of Testing	:	11.03.2017

Total Wt. of Aggregates in gms= **5000**

IS Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2011)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	96.16	95-100	85-100
20	33.66	30-70	0-20
10	13.62	10-35	0-5
4.75	3.06	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under graded specific limits.

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Job No.: CTCE/BBMP/W.No.08/NVR/CSR-03/292m/AGG/GR/2016-17 11.03.2017

TEST REPORT ON SIEVE ANALYSIS OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Coarse Aggregates (20mm)
Technical Reference	:	IS : 2386 (Part 1) -1963(RA-2011)
Sample Received on	:	10.03.2017
Date of Testing	:	11.03.2017

Total Wt. of Aggregates in gms= **5000**

IS Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS :383-1970 (RA- 2011)	
		Graded	Single Sized
40	100	100	100
20	96.34	95-100	85-100
10	35.16	25-55	0-20
4.75	8.00	0-10	0-5

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits

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Job No.: CTCE/BBMP/W.No.08/NVR/CSR-03/292m/Precsat slab/2016-17 28.03.2017

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CORE

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of sub work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Precsat slab
* Grade of Concrete	:	M_{15}
Techinical Reference	:	IS:516-1959 (RA- 2013), SP-24:1983.
Sample Received on	:	25.03.2017
Date of Testing	:	28.03.2017

Sl. No	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	78.00	0.389	2539.95	1.56	0.952	23.50	11.97	12.93	13.57	16.96
2	50.00	79.00	0.399	2572.27	1.58	0.955	24.95	12.71	13.72	13.10	16.38
3	50.00	80.00	0.403	2565.58	1.60	0.957	26.35	13.42	14.49	13.87	17.33

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Job No.: CTCE/BBMP/W.No.08/NVR/CSR-03/292m/Cube/2016-17 25.04.2017

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of the work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Cement Concrete
Technical Reference	:	IS: 516-1959 (RA-2013)
Size of cubes	:	150mmx150mmx150mm
Cross Sectional Area	:	22500 mm^2
* Grade of Concrete	:	M_{15}
Compressive Strength as on	:	28^{th} day
Sample Received on	:	25.04.2017

Sl.No.	Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	28.03.2017	25.04.2017	8.123	369.6	16.43
2	28.03.2017	25.04.2017	8.269	379.8	16.88
3	28.03.2017	25.04.2017	8.382	389.5	17.31

*Information is furnished by the Customer/Representative.

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Job No.: CTCE/BBMP/W.No.08/NVR/WMM/Gradation/2016-17 28.04.2017

TEST REPORT ON GRADATION OF WET MIX MACADAM

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS 2386 (part-1)1963 (RA-2016)
Date of Testing	:	28.04.2017

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits As per Morth Table 400-11
53	0	0	0	100	100
45	180	180	3.6	96.4	95-100
22.4	1520	1700	34.00	66.00	60-80
11.2	1020	2720	54.40	45.60	40-60
4.75	535	3255	65.10	34.90	25-40
2.36	590	3845	76.90	23.10	15-30
0.600	615	4460	89.20	10.80	8-22
0.075	425	4885	97.70	2.30	0-8

*Information is furnished by the Customer/Representative.

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Job No.: CTCE/BBMP/W.No.08/NVR/CSR-03/292m/WMM/AIV/2016-17 28.04.2017

TEST REPORT ON IMPACT VALUE OF AGGREGATE

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS: 2386 Part IV
Date of Testing	:	28.04.2017

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	396	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	311	314	
4	Aggregate Impact value = percent fines 100* (W2/W1)%	20.05	20.71	**20.38**

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Aggregate Impact value for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.08/NVR/CSR-03/292m/WMM/Shape.T/2016-17 28.04.2017

TEST REPORT ON FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Wet Mix Macadam
Technical Reference	:	IS 2386(Part 1) 1963 (RA 2016)
Date of Testing	:	28.04.2017

Sl.No.	Description	Result
1	Flakiness Index	11.62%
2	Elongation Index	13.28%
3	Combined Flakiness & Elongation Index	24.90%

*Information is furnished by the Customer/Representative.

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Comments:

→ Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.08/NVR/CSR-03/292m/QB(BC)/2016-17 03.04.2017

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

* Customer	:	**Asst. Executive Engineer**, Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Bitumen
Source/ Location	:	Hot Mix Plant, Bangalore.
Sample Received on	:	01.04.2017
Period of Testing	:	03.04.2017

The results of the tests conducted on the bitumen sample are as follows:

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2014)	82	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2014)	44	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2014)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2014)	298	Min. 220

* Information is furnished by the Customer/Representative

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Job No.: CTCE/BBMP/W.No.08/NVR/BC/AIV/2016-17 03.04.2017

TEST REPORT ON IMPACT VALUE OF AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Hot mix plant, Bangalore.
* Type of Mix	:	Bituminous Concrete
Technical Reference	:	IS: 2386 (Part- 4)-1963 (RA-2011)
Date of Testing	:	03.04.2017

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	383	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	304	
4	Aggregate Impact value = percent fines 100* (W2/W1) percent	21.41	21.45	**21.43**

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.08/NVR/BC/Shape.T/2016-17 03.04.2017

TEST REPORT ON FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Hot mix plant, Bangalore
Technical Reference	:	IS : 2386(Part -1)-1963 (RA-2011)
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	03.04.2017

Sl.No.	Description	Result
1	Flakiness Index	11.92%
2	Elongation Index	13.28%
3	Combined Flakiness & Elongation Index	25.20%

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

Note:

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Job No.: CTCE/BBMP/W.No.08/NVR/BC/Stripping/2016-17 04.04.2017

TEST REPORT ON STRIPPING VALUEOF ROAD AGGREGATES (STATIC IMMERSION TEST)

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
Technical Reference	:	IS: 6241
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	04.04.2017

Type of binder : 80/100
Percentage of binder used : 5.00% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.00 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.3	3.47	96.53
2	3.6		
3	3.5		

*Information is furnished by the Customer/Representative.

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.08/NVR/BC/Sp_Wa/20016-17 04.04.2017

TEST REEPORT ON SPECIFIC GRAVITY AND WATER ABSORPTION

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Hot mix plant, Bangalore
Technical Reference	:	IS : 2386(Part -3)-1963 (RA-2011)
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	04.04.2017

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2008	2009	2010	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1239	1238	1255	
4	Weight of saturated surface dry aggregate in air	W_3 g	2004	2005	2006	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	765	767	751	
6	Weight of oven dried aggregate	W_4 g	1993	1994	1994	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.605	2.600	2.655	2.620
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.643	2.638	2.698	2.660
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.55%	0.55%	0.60%	0.57%

*Information is furnished by the Customer/Representative.

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No: CTCE/BBMP/W.No.08/NVR/BC/Bitumen/2016-17 04.04.2017

TEST REPORT ON BITUMEN CONTENT OF BITUMINOUS CONCRETE MIX

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Roads in Hebbal Sarova, Balaji Layout Ward No.08, BBMP, Bangalore.
Technical Reference	:	IRC:SP:11-1984
Date of Testing	:	04.04.2017

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	473
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	27.00
7. Bitumen content in %	5.20	5.40
8. Average	**5.30**	

*Information is furnished by the Customer/Representative.

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Job No: CTCE/BBMP/W.No.08/NVR/BC/Bitumen/2016-17 04.04.2017

TEST REPORT ON BITUMEN CONTENT AFTER GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Roads in Hebbal Sarova, Balaji Layout Ward No.08, BBMP, Bangalore.
Technical Reference	:	IS 2386 and IRC:SP:11-1984
Date of Testing	:	04.04.2017

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	43.15	9.10	9.10	90.90	79-100
9.5	35.28	7.44	16.55	83.45	70-88
4.75	72.25	15.24	31.79	68.21	53-71
2.36	69.32	14.62	46.41	53.59	42-58
1.18	53.15	11.21	57.63	42.37	34-48
0.6	56.36	11.89	69.52	30.48	26-38
0.3	45.15	9.53	79.04	20.96	18-28
0.15	33.15	6.99	86.04	13.96	12-20
0.075	32.25	6.80	92.84	7.16	4-10

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-18 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
19	0	0	0	100	100
13.2	32.92	6.96	6.96	93.04	79-100
9.5	43.25	9.14	16.10	83.90	70-88
4.75	66.35	14.03	30.13	69.87	53-71
2.36	72.25	15.27	45.41	54.59	42-58
1.18	65.15	13.77	59.18	40.82	34-48
0.6	52.26	11.05	70.23	29.77	26-38
0.3	35.26	7.45	77.68	22.32	18-28
0.15	29.32	6.20	83.88	16.12	12-20
0.075	39.63	8.38	92.26	7.74	4-10

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Job No.: CTCE/BBMP/W.No.08/NVR/BC/Agg/2016-17 04.04.2017

TEST REPORT ON GRADATION OF AGGREGATE

* Customer	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
* Name of Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
* Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Sample ID	:	Bituminous Concrete
Technical Reference	:	IS : 2386(Part -1)-1963 (RA-2011)
* Type of Mix	:	Hot mix plant, Bangalore
Date of Testing	:	04.04.2017

Total Weight of Sample: **5150** gm

Sieve Size, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per `MORTH 500-18
13.2	725	14.08	14.08	85.92	79 - 100	
9.5	560	10.87	24.95	75.05	70 - 88	
4.75	640	12.43	37.38	62.62	53 - 71	
2.36	585	11.36	48.74	51.26	42 - 58	
1.18	535	10.39	59.13	40.87	34 - 48	
0.600	535	10.39	69.51	30.49	26 - 38	
0.300	575	11.17	80.68	19.32	18 - 28	
0.150	315	6.12	86.80	13.20	12 - 20	
0.075	315	6.12	92.91	7.09	4 - 10	

Total Weight of Sample: **5300** gm

Sieve Size, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH 500-18
13.2	610	11.51	11.51	88.49	79 - 100	
9.5	620	11.70	23.21	76.79	70 - 88	
4.75	620	11.70	34.91	65.09	53 - 71	
2.36	565	10.66	45.57	54.43	42 - 58	
1.18	615	11.60	57.17	42.83	34 - 48	
0.600	545	10.28	67.45	32.55	26 - 38	
0.300	525	9.91	77.36	22.64	18 - 28	
0.150	355	6.70	84.06	15.94	12 - 20	
0.075	465	8.77	92.83	7.17	4 - 10	

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Job No.: CTCE/BBMP/W.No.08/NVR/BC/Stability/2017-18 04.04.2017

TEST REPORT ON MARSHALL STABILITY OF MIX

* Customer	:	**Asst. Executive Engineer**, Kodigehalli Sub Division, BBMP, Bangalore.
* Agency	:	**Mr. N. Venkata Reddy,** #92, 7th Main Road, 4th Cross, J.C. Nagara, Mahalakshmipuram (P), Bangalore - 560 086.
*Name of the Work	:	Improvements to Roads and Drains in Hebbal Sarova, Balaji Layout and surrounding areas in Ward No.08, Kodigehalli, BBMP, Bangalore.
*Reference	:	AEE/KH/QC/PR/202/2016-17 Dated: 10.03.2017
* Source	:	Hot mix Plant, Bangalore
* Type of Mix	:	Bituminous Concrete
Date of Testing	:	04.04.2017

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshall Stability, Kn	9.05	9.35	9 Kn (min)
2	Marshall flow, mm	2.35	2.65	2 – 4
3	Percent air voids in Mineral Aggregate	3.15	3.30	3 – 6
4	Voids in Compacted Mix	13.30	14.05	13 - 15
5	Percent Voids filled with Bitumen	66.50	67.85	65 - 75
6	Density, g/cc	2.26	2.27	--

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